in the capillary tube, but the ζ Puppis lines were not observed.

The positions of the observed lines of the Principal series are 4685·98, 2733·34, 2385·47, and 2252·88, all of which are slightly more refrangible than the wave-lengths calculated by Rydberg. Using oscillation frequencies *in vacuo*, the lines are represented by the equation

$$n = 48764{\cdot}0 \, \frac{109675}{(m + 0{\cdot}999606)^2},$$

where m has the values 1, 2, 3, 4. The wave-length of the first line sufficiently justifies its identification with the high-level line 4685·90 in the chromosphere (Lockyer), the nebular line 4685·73 (Wright), the Orion star line 4685·4 (Pickering), and probably also with 4688 of the bright line stars.

The new ultra-violet series includes strong lines at 3203·30, 2511·31, and 2306·20, which may be connected by the equation

$$n = 48763{\cdot}8 \, \frac{109675}{(m + 0{\cdot}499506)^2},$$

where m has the values 2, 3, 4. The limit is identical with that of the Principal series, and the new lines are provisionally regarded as forming a second Principal series. Hydrogen is apparently unique in having two Principal series so related. It has so far only been possible to identify three members of the ζ Puppis series, their approximate wave-lengths being 5410·5, 4541·3, and 4200·3.

The investigation is regarded as giving another indication of the probability that there are no special kinds of matter in celestial bodies, and that most of the celestial spectra are reproducible in laboratory experiments.

PELLAGRA.

THE announcement, a few weeks ago, that pellagra has been found in the British Islands is of no slight importance. For, if half-a-dozen genuine cases have been found, we may be fairly sure that many hundreds are waiting to be found. In the United States, it is only five years since Dr. Babcock and Dr. Watson directed general attention to the presence of this disease in their country We now have clear evidence that pellagra has been found in no fewer than thirty-five States; and several thousands of cases have already been found and noted. In the final stage, the central nervous system is affected, and the patient is apt to become insane; it is possible, therefore, that many cases will be found, by diligent examination, among the inmates of asylums. Still, we have no reason to believe that pellagra has ever been, or will ever be, so heavy on this country as on Italy.

Out of the admirable work done by the Pellagra Commission (1909) came Dr. Sambon's theory that the disease is one of the insect-borne infections, and that the infecting agent is Simulium, one of the "midges." It is a not improbable corollary, with some direct evidence in its favour, that the organism of pellagra is a protozoon, similar in nature to the protozoon of malaria.

Against this theory, based on long and laborious study of the districts where pellagra lies heaviest on the people, there is the old theory that the disease is due to the eating of unwholesome maize: that some bacterial change in the maize causes it to act as a slow poison. Perhaps, in a few years, these opposed theories, which now seem utterly irreconcilable, may be brought nearer together by a new series of observations, at some level which is not yet in sight. Meanwhile, in the general opinion of experts, the old theory—that bad maize, *ipso facto,* induces pellagra—is losing ground. One is reminded of the old theory that the eating of the manioc-root was the cause of the African sleeping-sickness; and one is tempted to think that the maize-theory of pellagra will have the same fate.

Certainly, if a notable number of cases of the disease be found in this country, the maize-theory will become even harder to hold.

The earliest full account, in our language, of the disease is probably the paper by Dr. Sandwith (Brit. Med. Ass. Edinburgh meeting, 1898). His study of pellagra in Lower Egypt is well known to all pathologists. For the facts about pellagra in the United States we have Dr. Niles's recent book, "Pellagra: an American Problem" (Saunders, Philadelphia, 1912), and, with much other literature, two important papers in the Transactions of the Society of Tropical Medicine and Hygiene (January, 1912), by Dr. Stannus and Dr. Sandwith, with a discussion, in which Dr. Sambon and Dr. Chalmers took part. The reference to pellagra in the British Islands is *British Medical Journal,* October 26, 1912.

It is fairly certain that careful collective investigation will bring to light many cases of pellagra in this country, and the experts will perhaps be enabled thereby to set aside the "maize theory," and all modified forms of that theory, and to class the disease with malaria, yellow fever, and sleeping sickness. Still, it is not impossible that the maize theory and the Simulium theory may, by further study of the facts of the incidence and geographical distribution of the disease, be found less hostile to each other than they appear to be at the present time.

NOTES.

WE heartily welcome the new Society for the Promotion of Nature Reserves. Its objects, as officially stated, are as follows:—(1) To collect and collate information as to areas of land in the United Kingdom which retain their primitive conditions and contain rare and local species liable to extinction owing to building, drainage, and disafforestation, or in consequence of the cupidity of collectors. All such information to be treated as strictly confidential. (2) To prepare a scheme showing which areas should be secured. (3) To obtain these areas and hand them over to the National Trust under such conditions as may be necessary (4) To preserve for posterity as a national possession some part at least of our native land, its fauna, flora, and geological features. (5) To encourage the love of nature and to educate public opinion to a better knowledge of the value of nature-studv. The president is the Right Hon. J. W. Lowther, M.P., the hon. secretaries are Mr. W. R. Ogilvie-Grant and the Hon. F. R. Henley. The temporary address of the society is the Natural History Museum, Cromwell Road, S.W. There is no subscription. The principle of centralising the various efforts already instituted in this country towards the preservation of its "natural monuments" has for some time past been advocated in these columns. The mechanism by which reservation is to be effected has already been put into operation by the acquisition of Blakeney Point in Norfolk. The highly successful scheme which has been worked in Prussia for some eight years is, we may note, governmental, and has a special commissioner, Dr. Conwentz, the pioneer of the movement, at its head. It seems to us that some such close connection with the national executive is essential for the full success of any society, however strong.

AT the Dundee meeting of the British Association in September last the president of the Zoological Section, Dr. P. Chalmers Mitchell, F.R.S., took as the subject of his address, "The Preservation of Fauna." At the close of the meeting the general committee passed on to the council, for consideration, a resolution, which has now been adopted in the following terms:—"That the British Association for the Advancement of Science deplores the rapid destruction of fauna and flora throughout the world, and regards it as an urgent duty that steps should be taken, by the formation of suitably placed reserves, or otherwise, to secure the preservation of examples of all species of animals and plants, irrespective of their economic or sporting value, except in cases where it has been clearly proved that the preservation of particular organisms, even in restricted numbers and places, is a menace to human welfare."

THE news of the death of Mr. Henry de Mosenthal, which occurred on December 18, at sixty-two years of age, will be deeply regretted by those numerous friends and technologists with whom his long association with the well-known firm of Nobels brought him into relationship Mr. de Mosenthal had acted as technical secretary since the formation of the Dynamite Trust Company in 1886, but his association with Nobels goes back some years earlier. Mr. de Mosenthal became a member of the Society of Chemical Industry in 1888, and two years later he was elected a fellow of the Chemical Society. He contributed to the publications of each, and the series of three papers on observations on cotton and nitrated cotton appearing in the Journal of the former society in 1904, 1907, and 1911 record a large number of valuable determinations of the physical properties of these bodies, especially in solution. In the first contribution he demonstrated that the cuticle of the cotton fibre is extremely porous, that rows of pores and stomata may be observed on the surface under oblique illumination. His experiments also showed that the single cotton fibre exhibited no capillary action, which is contrary to the commonly accepted view, but that several fibres must be in contact before the well-known capillary action became manifest.

THE Paris Société d'Encouragement has received a legacy of 4000*l.*, bequeathed to it by the late M. Osmond.

THE silver medal of the Zoological Society has been conferred on Major J. Stevenson-Hamilton, Game Warden of the Transvaal, in recognition of his valuable services in connection with the King's African collection.

WE learn from *The Times* that a new cancer institute has been established at the Brompton Cancer Hospital, at a cost of some 6000*l.* The importance of X-rays and other electrical methods in the treatment of malignant disease is now fully recognised, and the institute has in its possession an excellent equipment for this branch of therapeutics.

THE director of the Science Museum, South Kensington, informs us that a temporary collection at the museum in illustration of the history of aeronautics and some of the scientific researches which are applied in the design, construction, and use of aëroplanes will be open to the public from December 23 until the end of January.

THE eighty-first annual meeting of the British Medical Association will be held in Brighton next July. The president's address will be delivered on July 22, and the sections will meet on the three following days. Dr. W. A. Hollis, consulting physician, Sussex County Hospital, is the president-elect. The address in medicine will be delivered by Prof. G. R. Murray, physician to the Royal Infirmary, Manchester, on July 23. The address in surgery will be delivered by Sir Berkeley Moynihan, professor of clinical surgery in the University of Leeds, on July 24. The popular lecture will be delivered by Mr. E. J. Spitta on the evening of July 25. The scientific business of the meeting will be conducted in fifteen sections, which will meet on July 23 to 25. These sections, with their presidents, are as follows:—Bacteriology and Pathology, Dr. J. W. H. Eyre; Dermatology, Dr. J. H. Sequeira; Diseases of Children, including orthopædus, Dr. G. F. Still; Electro-therapeutics, Mr. W. D. Butcher; Gynæcology and Obstetrics, Mr. R. Sanderson; Laryngology, Rhinology, and Otology, Mr. A. J. Hutchison; Medical Sociology, Dr. R. J. Ryle; Medicine, Dr. E. Hobhouse; Navy and Army, and Ambulance, Colonel James Turton, V.D.; Neurology and Psychological Medicine, Dr. J. Taylor; Ophthalmology, Mr. T. H. Bickerton; Pharmacology, Therapeutics, and Dietetics, Dr. W. H. Hale; State Medicine, Dr. E. W. Hope; Surgery, Mr. W. T. Thomas; Tropical Medicine, Lieut.-Colonel Sir William Leishman, F.R.S.

THE report of the council of the Scottish Meteoro-ogical Society, adopted at the annual general meeting on December 10, shows that during the past twelve months the society's system of observations has been strengthened by the re-establishment on a satisfactory basis of a station at Braemar, with Mr. A. M. Shirran as principal observer. Observations were originally established there under the direction of the late Prince Consort; a continuous series exists for the period 1856–1905. The Registrar-General for Scotland has been supplied regularly with monthly and quarterly reports from the office of the society, and also, direct from the observers in eight of the large towns of Scotland, with the daily observations of temperature and rainfall required for his weekly reports. The Meteorological Office in London has received direct from the observers at certain stations daily observations of temperature, rainfall, and, in some cases, sunshine for its Weekly Weather Reports. The council regrets to report a shrinkage in the membership of the society, due largely to the deaths of subscribers of long standing. A shrinkage in membership implies a reduction of income, and but for a considerable demand for the society's publications, there would have been a serious deficit for the financial year ending June 30 last. The expenditure of the society has been reduced to the lowest possible limit, but it will exceed the income for the current year unless there is a large accession of new members. The council has lodged an application with the Registrar-General for Scotland for a grant sufficient to defray the entire cost of the reports supplied to him by the society. Mr. J. Mackay Bernard has been elected president for the coming year.

Prof. H. H. W. Pearson, of the South African College, Cape Town, sends us a copy of a letter from *The Cape Times* of October 29 last, wherein the Hon. A. Wilmot, formerly a member of the Cape Legislative Council, describes the appearance from the deck of ss. *Dover Castle*, then in the southern portion of the Gulf of Guinea, of an object regarded as "the head and neck of a monster—seemingly a serpent—extending at least fourteen feet above sea-level. Mr. Wilmot saw this object, as it pursued its way through the water, six times in the space of about two minutes; and it was independently noticed once or twice by several persons on board. The day, October 17, was exceedingly clear, and, according to Mr. Wilmot, "it is preposterous to talk of five independent witnesses being imposed upon by mistaking porpoises, a flight of sea-birds, seaweed, or cane for the sea monster they undoubtedly did see at a distance estimated at one and a half miles." In the face of this testimony no one will deny that something strange to the passengers, but interpreted as the head and neck of a serpent, was observed by them on the occasion mentioned. But since there is neither sketch nor detailed description of the apparition to help in determining to what class of the animal kingdom it belonged, we venture to suggest that it may have been the upraised tentacular arm of a large kind of pelagic squid swimming near the surface. These arms are long and flexible, and expand somewhat abruptly at the end into an enlargement which at a distance might be mistaken for the head of a snake attached to a slender neck. The size of the object observed is no obstacle to this suggested explanation, since the tentacular arms of some of these gigantic squids reach a length of about thirty feet.

Among the Bulletins of the Philosophical Society of the University of Virginia there appeared in July, 1912, a paper by Mr. H. E. Jordan, entitled "Studies in Human Heredity." The characters dealt with are left-handedness, pulmonary tuberculosis, cancer, hermaphroditism, onyxis (ingrowing toe-nails), nephritis, and melancholia. The method of study is the collection of pedigrees, on which a Mendelian interpretation is put with rather too great readiness. It is to be regretted that some care was not taken to describe the actual condition found in each individual. This lack of definite information is particularly noticeable in the case of left-handedness, which occupies more than half the paper. Left-handedness occurs in a variety of forms, and it would have added much to the value of the pedigrees if the author had noted, wherever possible, in what manner it was exhibited. Among the left-handed acquaintances of the present writer one used to write left-handed, but played games right-handed; in the majority this condition is reversed. One was in his early childhood so apt with left hand that he learnt to write with it, and then, having acquired the art of writing clearly and well, he appeared to forget it again; his letters became more and more unformed and slovenly in appearance, until, at the age of six and a half, it was thought better that he should commence again with his right hand. Would Mr. Jordan class all these cases indiscriminately as left-handed?

To *The Field* of December 14 Mr. Pocock contributes a note, with an illustration, of two long-beaked spiny anteaters now on exhibition in the Zoological Society's Gardens. They form, apparently, part of a consignment of eight recently brought by Mr. Paul Kibler from the Charles Louis Mountains of Dutch New Guinea. In commenting on the height at which the body is carried above the ground—a feature in which these anteaters differ from the ordinary species—Mr. Pocock states that the pose of the limbs should be compared with that of tortoises rather than with that of elephants. The author quotes a letter from the Hon. Walter Rothschild relative to the five races by which the long-beaked species is locally represented in New Guinea.

In the November issue of the Journal of the East Africa and Uganda Natural History Society reference is made to a decrease in the membership of the society and the lack of sufficient literary matter for the journal, of which only two numbers are in the future to be issued annually. Such want of support is to be deplored, especially in a country so rich in natural history subjects as Uganda. In an article on early man Mr. C. W. Hobley observes that while stone implements are common in Egypt and Cape Colony, they are relatively rare in B.E. Africa; and suggests that this may be due to the sparse population of the country in prehistoric times, when volcanic action appears to have been rife. Most of the implements hitherto found are of a crude type; and if it be true, as some suppose, that Africa was the cradle of the art of working in iron, this industry may have crushed out of existence the manufacture of stone implements, which consequently never attained the beauty and finish characterising those of Neolithic Europe.

The zoological expedition to the Altai Mountains, Siberia, and Mongolia, organised and carried out by the cooperation of the United States National Museum with the Museum of Comparative Zoology at Harvard, has recently returned to the United States after an especially successful trip of about four months' duration. The expedition was under the direction of Dr. Theodore Lyman, of Cambridge, Mass., and the National Museum was represented by Mr. N. Hollister, of the division of mammals. It was the object of the expedition to collect the mammals and birds of the Altai Mountains, especially the very large wild sheep of this region, and in this respect the expedition succeeded far beyond expectations. Among the small mammals there have been found several new species, diagnoses of which are given in a pamphlet entitled, "New Mammals from the Highlands of Siberia," written by Mr. Hollister, and just published by the Smithsonian Institution, forming publication No. 2157 of the Smithsonian Miscellaneous Collections. The whole collection includes about 750 mammals and birds, among them a fine series of the wild sheep of the Altai region, which is the largest known species of sheep, together with ibexes, gazelles, and other large game. The specimens will be divided between the two institutions interested.

The U.S. Department of Agriculture has issued (Forestry Service, Bulletin 85) a description of the chaparral, or dwarf forest vegetation of Southern California, by F. G. Plummer. The chaparral, or "elfin wood," is one of the types of stunted forest—a plant formation found in several widely separated parts of the world—and is one of the intermediate forms between a flourishing forest and a desert, representing a condition of balance between certain environmental extremes, a balance at which the growth is dwarfed and the full-grown trees attain only the dimensions of brush, being rarely more than 10 ft. high. It is sharply distinguished in composition from the dwarf forest formations of high latitudes and altitudes on one hand, and from the tropical and subtropical dwarf forests on the other; its dominant species belong to the genera Adenostoma, Arctostaphylos, Ceanothus, and Quercus, though the dominant forms often vary on adjacent watersheds. The memoir includes a discussion of the ecological relations of the chaparral species, the importance of the tree-cover in conserving moisture, the methods of controlling the destructive fires which rapidly sweep the more or less arid vegetation, and the possibility of introducing large tree species; hence it is of interest to the forester and geographer, as well as to the botanist.

Another text-book, modestly styled a "Guide to the Collection of Gemstones in the Museum of Practical Geology," has been issued by that museum (obtainable through any bookseller from T. Fisher Unwin, London, price 9d.). Mr. W. F. P. McLintock here describes the properties of gems, with an excellent account of the influence of refractive index and internal reflection, and of the mysterious nature of colour. Eight pages are devoted to artificial gems. In the descriptive portion, euclase, benitoite, and variscite take their place as gemstones.

Oberlehrer L. Wunder, of Sendelbach bei Lohr, has published separately, through Teubner of Leipzig (price 1.50 marks), his observations on the Kerlingarfjöll and other highlands in Iceland. He has determined barometrically, with due precautions, a number of heights for the first time, and is able to correct some features of the current geological map of the country. His observations on the rapid variations of glacier-streams as the comparatively feeble sunlight waxes or wanes are of considerable interest. In the Hofsjökull a true ice-dome of the Norwegian type is encountered, with marginal glacier-tongues.

The continued interest taken by geologists in the origin of the British Triassic strata has been more than once noticed in these columns. Mr. T. O. Bosworth has now published, though the Leicester Literary and Philosophical Society, his researches on "The Keuper Marls around Charnwood" (Leicester: Thornley and Son). Particular attention is paid in this excellently illustrated volume to the rock-surfaces exposed by quarrying beneath the Trias, and to the blocks from these surfaces carried into the marls by weathering agents in Triassic times. More than 40 per cent. of calcium and magnesium carbonate has been found in some of the marls. The author believes that the red marls accumulated in comparatively deep standing pools, the alternating grey bands representing coarser matter swept in from the desert areas during rains.

Prof. S. Passarge has written, as a part in the *Mitteilungen* of the Geographical Society of Hamburg (Hamburg, L. Friederichsen and Co., 1912), an elaborate survey of morphological geography, which he endeavours to classify with the same precision as a department in zoology. His method can be indicated by quoting an example. In systematic morphology the two "types" are land-forms and coast-forms. In the first of these, volcanic-forms make the second order in the class of endogenous forms, and this order is divided into the family of intrusions and eruption-forms, the latter being separated into one genus (*Gattung*) of explosive discharges and another of effusive discharges, the second consisting of the following specific forms: dome-volcanoes, shield-volcanoes, and flows. This has a very orderly aspect, and examples may be found which can be easily fitted into the several pigeon-holes, but most volcanoes of any size are composite in character, built up of discharges of scoria and flows of lava, and traversed by dykes and other intrusions. To draw hard and fast lines is more difficult in geography than most other branches of science, and, although some technical terms are necessary, it is doubtful whether they can be very precisely defined. Prof. Passarge's work is an example of German thoroughness, with perhaps a corresponding tendency to over-classification, and it will be found, we think, more useful to teachers than to students, for the latter may find that minute attention to the trees rather hinders them from seeing the wood.

Dr. Philip Eredia sends us a useful discussion, entitled "The Diurnal Variation of Temperature in Italy" (excerpt from the Annals of the Central

Meteorological Office, part i., 1912). The investigation is based on observations from 1892–1906 at 120 stations, at which no interruption had taken place during the period. The tables include monthly, seasonal, and yearly mean values of the daily maxima and minima, and of their difference (or mean daily range), each being separately treated, except in the annual summary. This special treatment of the various data, especially of the daily range, is of considerable climatic interest. The author also gives, for all stations, the value for each month and season of the varying coefficient involved in Kämtz's formula for obtaining true daily means of temperature. Among many useful results it is noted that, generally speaking, the effect of latitude is not very distinctly shown in the annual values of the maxima and minima, owing to the many local influences at work. The annual range is greatest in the interior, especially in Upper Italy, where, proceeding inland from the Adriatic coast, constantly increasing values occur.

The International Geodetic Conference, which met at Hamburg in September last, among other important questions discussed the subject of the precision of a level network, and laid down a new standard of accuracy for "nivellements de haute précision." Such a standard will doubtless prove of great value to the directors of large surveys plannning new levelling work, and it will be interesting to see a detailed discussion of the errors of an actual reseau compared with the limiting errors calculated from the formulæ approved by the conference. Short of this, it is not possible to institute a strict comparison between the two, but it would appear that good modern work, such, for instance, as the Indian Survey Department's precision levelling, falls well within the prescribed limit. The thanks of all geodesists are due to Lieut.-Col. Lallemand for the trouble he has taken in this matter, and for his long-continued and most valuable contributions to this branch of geodesy. Pending the publication of the conference volume, a summary of the formulæ in question will be found in the *Comptes rendus* of the Paris Academy of Sciences for October 14, 1912.

The indefatigable and distinguished seismologist, Dr. F. Omori, in vol. v., No. 7, of the Japan *Astronomical Herald,* has branched off on a new line and given us an interesting and instructive article on the variation of latitude and changes in the mean sea-level of Japan. First we are introduced to a table which gives in millimetres mean sea-level in successive years at nine stations round the coast of Japan. A glance at this shows that although sea-level during twelve months may have increased at one station, at other stations during the same period it may have decreased. The greatest fluctuations appear to have taken place at Misaki, which lies just outside the Bay of Yedo. In 1897 the sea-level at this place remained constant, but by 1909 it had risen 166 millimetres. An annual average value of the records of nine stations, when they are plotted on squared paper, show that sea-level was low in 1897 and 1902, but it was high in 1899 and 1905. Beneath this diagram Dr. Omori has given a curve showing changes in latitude as observed at Tokyo and Mizusawa. The resemblance between these two diagrams is very striking, and from them it appears that a variation of $0''\cdot 1$ in latitude is accompanied by a change of 42 millimetres in sea-level.

A paper on searchlights for the mercantile marine, read before the Manchester Literary and Philosophical Society by Dr. Henry Wilde, F.R.S., on May 7, was reported and commented upon in the issue of Nature for May 30 (vol. lxxxix., p. 325). On November 12 Dr. Wilde returned to the question in a paper, entitled "On Searchlights and the *Titanic* Disaster," which he read to the same society. In this paper he passes in review the evidence given in connection with the use of searchlights in the report on the loss of the *Titanic,* and also the statements in the report of the Merchant Shipping Advisory Committee of the Board of Trade. After considering these reports, Dr. Wilde concludes his paper thus:—"In view of the facts brought out by the several committees engaged in investigating the causes leading to the loss of the *Titanic,* it only remains for me to repeat and to emphasise the statement made in my paper read before the society in May last, that the ultimate responsibility of a calamity which the world deplores rests upon the British naval authorities through their fatuous policy of excluding searchlights from the Mercantile Marine."

In the *Journal de Physique* for November, M. J. Bosler, in a paper on the relations between magnetic storms, earth currents, and solar eruptions, puts forward a theory of the production of magnetic storms which he believes to be new. He was, it appears, led to it by finding that the horizontal component of the disturbing force in a magnetic storm is on the average at right angles to the direction of the earth current observed at the same instant at the same station, and that these currents flow at each station in a direction which is nearly constant. At Parc Saint Maur, near Paris, for example, the direction is in general from north-east to south-west. M. Bosler considers these currents the cause of magnetic storms, and explains them as due to the expression for the magnetic induction through the earth having in it a variable term owing to electrified matter projected from the sun. This variable term would result in an electric current about the earth which in turn would produce a magnetic disturbance. Unfortunately, the author does not indicate how the term expressing the variable induction arises, nor does he trace the consequences of his theory any further. It seems, for example, to demand that magnetic storms should be most intense at any instant in the great circle perpendicular to the variable magnetic induction, a conclusion which might have been tested by comparison with observations.

Prof. C. Ravenna and Mr. G. Bosinelli describe in the *Atti R. Accad. Lincei* (vol. xxi., ii., 355) further experiments to ascertain whether the traces of hydrogen cyanide found in young plants exist therein in the free state, or solely in the form of cyanogenetic glucoside from which they are liberated by the action of an enzyme under the conditions of making the test.

The experiments were carried out with cherry laurel, *Phaseolus lunatus,* and germinating almond, and instead of using boiling dilute alkali to kill the plants, as in former experiments, concentrated salt solutions boiling at 110° were employed; in this way the plant enzymes were more rapidly destroyed, with the result that the amount of hydrogen cyanide indicated was thereby considerably diminished. It is thus considered probable that free hydrogen cyanide does not occur as such in the plant.

REPORT OF THE DEVELOPMENT COMMISSIONERS.

THE second report of the Development Commissioners, for the year ended March 31, 1912 (Wyman and Sons, price 8*d*.), was issued recently. It will prove convenient to review the report briefly under the chief headings contained therein.

General Position of Commissioners and Principles of Action.—As previously announced, the Commissioners cannot themselves make grants or loans, do not possess executive powers, and must receive applications through Government departments before reporting to the Treasury. It is gratifying to learn that the recommendations of the Commissioners have been adopted in all cases of importance. Owing to the fact that money must be entrusted to some suitable body, difficulties have arisen with regard to canals, roads, and some other matters coming within the scope of the fund, but it is expected that such difficulties will ultimately be overcome. The system of block grants has been adopted, which, though entailing some delay, is held to secure greater efficiency.

Although existing expenditure is not to be relieved, and local contributions are required, it is felt that authorities which have spent freely in the past should not be expected to find so large a proportion of the total sum to be expended in their areas as authorities which have been less enterprising.

The principle of loans is adopted for schemes expected to give a direct return ultimately. In some cases, such as afforestation, advances will be made on condition that the extent of the operations be varied according to the state of the labour market, so that some relief of unemployment may result. This does not apply to such part of the 325,000*l*. allotted to farm institutes as may be required for erecting buildings, these being urgently necessary.

The principle that the fund must not be used to benefit private individuals directly creates difficulties in the case of canals, estate afforestation, and light railways; for grants are here debarred, although private profits are associated with public benefits of an important kind. A different view must be taken of applications from public authorities for money to be applied in loans or grants to individuals, *e.g.* to fishermen. Such loans or grants would appear to be legitimate if they place individuals in a better position to help themselves, as in the case of advances enabling fishermen to acquire motor-boats.

The Commissioners consider it their duty to recommend expenditure when and where most likely to be remunerative with reference to the economic development of the United Kingdom as a whole, even though this may appear unfair to certain localities. The provision of harbours for steam-drifters, for example, is regarded as more important than the development of small centres employing more antiquated methods of catching fish

I. *Agriculture and Rural Industries.*—Three chief lines of action are reaffirmed as those of greatest importance, *i.e.* scientific investigation, research, and education as means of improving the quality and increasing the amount of agricultural products; supply of information regarding new crops and industries to cultivators for enabling extended practice; improvement of commercial methods by promotion of cooperation.

It is considered that pure research is not a local matter, and that it must be continuous and concentrated. Hence the selection of a comparatively small number of centres for research in the eleven main branches of agricultural science. It is recognised that research and education should be in close touch with one another, and although the fund is to be devoted to economic development, the Commissioners feel that when subsidising research the canon of apparent economic value should be cautiously applied.

In addition to grants to institutions, a sum of 3000*l*. per annum (probably to be increased to 5000*l*.) is reserved for individual investigators much on the lines adopted for the 4000*l*. per annum entrusted to the Royal Society for distribution. In this way it will be possible to utilise individual research ability wherever found. For purposes other than research England and Wales are to be divided into twelve provinces, each with its agricultural college providing the highest kind of agricultural education, demonstrating the results of research, and giving advice to farmers. The lower grades of instruction and advice will be provided by the farm institutes. The Commissioners consider that such an institute should possess two essential characteristics: first, the provision of shorter, simpler, and cheaper courses than those given at colleges; secondly, that it should serve as the headquarters of the county staff. A very large amount of elasticity is regarded as desirable, and there need be no "material embodiment in bricks and mortar." The general lines approved closely resemble those advocated at the cooperative conferences held between the governors of the Royal Agricultural College, Cirencester, and representatives of several county authorities in 1911.

Flax, hemp, tobacco, and beet are cited as crops requiring full investigation in order to determine whether they can be made a commercial success in this country.

The existing voluntary societies are to be utilised in organising cooperation, largely because "cooperation is particularly the kind of movement to which it is essential to retain the enthusiasm of voluntary workers." Considering the enormous amount of dairy and other farm produce imported, it is distressing to learn that "the question of agricultural cooperation in Ireland is unfortunately complicated by political differences." Other directions of activity include the continuance of light horse breeding schemes, the establishment of a cattle-testing station, and of a national poultry institute.

II. *Forestry.*—One guiding principle is here adopted, *i.e.* that "education and the provision of technical advice are the best lines of advance for the immediate present." This general idea is given effect by the recognition of five centres in England and Wales (Oxford, Cambridge, Cirencester, Bangor, and Newcastle), with suitable provision for Scotland and Ireland. Why the Commissioners consider that Oxford and Cambridge should be equipped for "higher education in forestry," and the other three centres for "forestry education of a simpler kind," is a mystery, without some reason for believing that the education so far given at Oxford and Cambridge has been